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ENVIRONMENTAL RESTORATION PROJECT **A**

Department of Energy
Environmental Cleanup Program

Environmental Restoration Project
Standard Operating Procedure

for:

Multi-Level Groundwater Sampling of Monitoring Wells Westbay MP System®

Los Alamos NATIONAL LABORATORY

Revision Log

Revision No.	*Effective Date*	*Prepared By*	*Description of Changes*	*Affected Pages*
0	4/27/01	Jennifer Kofoed	New procedure	All
1	07/12/02	Alethea Banar	Revised to address process changes and meet current procedure format requirements.	All
Review	06/28/2004	Don Hickmott	Deemed adequate.	All

Multi-Level Groundwater Sampling of Monitoring Wells Westbay MP System®

Table of Contents

Multi-Level Groundwater Sampling of Monitoring Wells Westbay MP System®

1.0 PURPOSE

This standard operating procedure (SOP) describes the process for sampling of multi-completion monitoring wells using the Westbay MP System® for the Los Alamos National Laboratory (LANL), Environmental Restoration Project (ER).

2.0 SCOPE

2.1 This SOP is a mandatory document and **ER users** shall implement when collecting groundwater samples from monitoring wells completed with the Westbay MP System® for the Environmental Restoration Project.

2.2 Subcontractors performing work under the ER's quality program shall follow this SOP for collecting groundwater samples from monitoring wells completed with the Westbay MP System® or may use their own procedure(s) as long as the substitute meets the requirements prescribed by the Environmental Restoration Project Quality Management Plan and is approved by the Environmental Restoration Project's Quality Program Project Leader (QPPL) before the commencement of the designated activities.

3.0 TRAINING

3.1 **ER personnel** using this SOP shall train by reading the procedure.

3.2 **ER personnel** using this SOP shall document training located at http://erinternal.lanl.gov/Training/login.asp in accordance with QP-2.2.

3.3 The **Field Team Leader** (**FTL**) shall monitor the proper implementation of this procedure and ensures that relevant team members complete all applicable training assignments in accordance with QP-2.2.

4.0 DEFINITIONS

4.1 *Electrical conductance or conductivity (EC)* — A measure of the ease with which an electrical current flows through a substance under the influence of an applied electrical field. When measured in water, it is dependent upon the presence of dissolved ions (total and relative concentrations, valence and mobility) and temperature. It is the reciprocal (inverse) of the resistance (R) in ohms between the opposite faces of a 1-cm cube of water at a specified temperature. Because R has units of ohm-meters (Ωx cm), EC has units of $(\Omega \text{x cm})^{-1}$, called Siemens (S). Most natural waters have rather low

conductivities, so EC is generally measured in microSiemens per centimeter (µS/cm). An EC value of 1 µS/cm is equivalent to a resistance of 10^6 Ωxcm.

4.2 *Hydrogen-ion activity (pH)* — The effective negative log base 10 of hydrogen ion [H^+] activity. A measure of how acidic or basic a solution is (numerically equal to seven for neutral solutions, increasingly basic above, and acidic below that value).

4.3 *Multiple-completion well* — A well constructed with two or more well screens across an equal number of zones of groundwater saturation.

4.4 *Personal Protective Equipment (PPE)* — Clothing worn by workers to minimize the potential for contaminatin to skin or personal clothing. Also refered to as anticontaminatino clothing or anti-C's. The degree of protective clothing required depends on the work area and nature of the job.

4.5 *Site-Specific Health and Safety Plan (SSHASP)*—A health and safety plan that is specific to a site or R-related field activity that was approved by an R health and safety representative. This document contains information specific to the project including scope of work, relevant history, descriptions of hazards by activity associated with the project site(s) and techniques for exposure mitigation (e.g., personal protective equipment) and hazard mitigation.

4.6 *Specific conductance* — The electrical conductance that would occur between the faces of a 1-cm cube of water at 25°C. Since EC is temperature sensitive, it is commonly corrected to its equivalent value at 25°C for data comparison. Some equipment makes this conversion automatically, in which case these readings should be noted as "at 25°C." Otherwise, the water temperature at the time of the conductance reading should always be recorded along with the conductance measurement so that the reading can later be corrected to 25°C.

4.7 *Turbidity* — Refers to inorganic solids and organic matter suspended in water. Turbidity, in nephelometric turbidity units (NTU), is measured as the intensity of light scattered by the suspended particulates in a water sample relative to a standard reference suspension. The goal of well purging for water sampling is to reduce turbidity to 5 NTU or less.

4.8 *Volatile organic Compounds (VOCs)* — A class of chemical compounds, predominantly hydrocarbons and halogenated hydrocarbons, with low molecular weights and low boiling points that are insoluble or slightly soluble in water.

5.0 BACKGROUND AND PRECAUTIONS

5.1 **Users** shall use this SOP in conjunction with an approved SSHASP. Also, consult the SSHASP for information on and use of all PPE.

5.2 The Westbay MP System® is a modular multi-level groundwater-monitoring device, using a single closed access tube with valved ports. The valved ports are used to provide access to several different levels of a borehole through a single well casing. The modular design permits as many monitoring zones to be established as desired during well completion. This system also allows for sampling without purging the zone under normal aquifer conditions before a sample is collected and takes samples at an in-situ pressure.

5.3 The Westbay MP System® consists of casing components, which are permanently installed in the borehole, portable pressure measurement and sampling probes and specialized tools.

5.4 The groundwater samples collected are representative of the saturated zone within a given interval of the hydrogeologic system and , discounting drilling artifacts, potentially representative of the aquifer in which the well was installed. Consult the well completion report for specific locations/depths of the valved sampling ports for each well.

5.5 **Users** shall handle all waste generated from monitoring well sampling in accordance with ER-SOP-01.06.

6.0 RESPONSIBLE PERSONNEL

The following personnel are responsible for activities identified in this procedure:

6.1 ER Project Personnel

6.2 Field Team Leader

6.3 ER Project Field Team Members

6.4 Sample Management Office

6.5 Subcontractors

7.0 EQUIPMENT

A checklist of suggested equipment and supplies needed to implement this procedure is provided in Attachment A.

8.0 PROCEDURE

8.1 Current Procedure Use

ER personnel may produce paper copies of this procedure printed from the controlled-document electronic file located at LANL, Risk Reduction and Environmental Surveillance. However, it is each person's responsibility to ensure that they trained to and utilize the current version of this procedure. The author may be contacted if text is unclear. The Document Control Coordinator (DCC) may be contacted if the author cannot be located.

8.2 Procedure Deviations

ER personnel shall make deviations from SOPs in accordance with QP-4.2, Standard Operating Procedure Development and shall document in accordance with QP-5.7, Notebook Documentation for Environmental Restoration Techncial Activities.

8.3 Sample Management Office

ER personnel shall coordinate the sampling effort with the Sample Management Office (SMO). (The SMO will give guidance regarding sample containers, preservation, and shipment to the SMO.)

8.4 Planning Document

ER personnel shall refer to the site work plan, sampling plan, or other appropriate plan to locate sampling site(s) and anticipated scope of work.

8.5 Notifications

ER personnel shall coordinate with the appropriate LANL contact to give written notification to the New Mexico Environmental Department (NMED) ten (10) days prior to the scheduled sample collection date. Notify ESH-18 a minimum of three (3) days prior to sampling if transducers need to be removed before sampling begins. Notify the Laboratory facility manager of the area being sampled.

8.6 Instrument Calibration

8.6.1 Control measuring and test equipment in accordance with QP-5.2, Control of Measuring and Test Equipment. **Field team members** shall calibrate instruments to be used for water quality readings. Refer to ER-SOP-06.02, Field Analytical Measurments of Groundwater or the instrument's operator manual for calibration requirements and instructions, whichever is more applicable to the instrument used.

8.6.2 **Field team members** shall record calibration and instrument model information in Field Notebook or Daily Activity Log and Water Quality Sample Records.

8.7 Sampling Operations using the Westbay MP System®

Field team members shall implement the following:

8.7.1 Assemble the appropriate equipment and supplies.

8.7.2 Set up the down-hole winch over the monitoring well.

8.7.3 Attachment Attach the MOSDAX handheld controller to the winch control panel. (Refer to the Westbay Operations Manual.)

8.7.4 Attach the MOSDAX sampler/monitoring probe to the end of cable winch line. (Refer to the Westbay Operations Manual.)

8.7.5 Attach (up to four) one-liter stainless steel sampling bottles to the sampler probe.

8.7.6 Complete surface function checks, noting that the arm should take 15 rotations to extend and the shoe should take under 23 rotations. If there are discrepancies in these numbers, the insturement will not properly seat. Fill out the Groundwater Sampling Field Data Sheet and follow step by step for retrieval of samples (Attachment B).

8.7.7 Fill out the Water Quality Sampling Record and record pertinant field measurments, chemisty determinations and other information as needed (Attachment C).

8.7.8 Perform field chemistry measurements on each sample run. Discard water used for field measurements upon completion, do not use for analytical sample. Special precautions should taken if the turbidity is > 5 NTU. Consult the Project Leader to identify if only filtered samples should be taken.

8.7.9 Collect groundwater samples according to ER-SOP-01.02 and ER-SOP-06.03 (if applicable). Collect non-filtered samples by filling the bottles in the order of most volitile to leaset volatile. If a priority list has been established, collect the samples in that order.

8.7.10 Collect a volitile organic compound sample by opening the valve on the bottom of the Westbay sample bottle and adjusting the flow to slowly fill the vial until a reverse meniscus forms above the top of the vial. Screw on the cap, invert, and tap the bottle to check for the presence of air bubbles. If air bubbles are present, the sample should be collected again.

8.7.11 Collect filtered samples using a 0.45 µm pore size filter. The filter may be a flat membrane supported by a filter-holder assembly or

may be an in-line cartridge filter. If the filter-holder assembly is used, field personnel must ensure that it was thoroughly cleaned and decontaminated. Filters coarser than 0.45 µm may be used to pre-filter; however, the final filter size must be ≤ 0.45 µm. Flow a minimum of 100 ml of the sample through the filter and discard the filtered water before collecting a filtered sample for analysis. Follow ER-SOP-01.02 when choosing the proper container and perservation technique for each analytical suite.

8.7.12 Occasionally it may be necessary to collect a sample in the field and filter at another location. Reasons include the following: 1) it may not be practical to use filtration apparatus at a remote site or 2) the water sample is too turbid to filter at the time of collection. If the latter is the case, allow the suspension in the water sample to settle before filtering and preserving. An appropriate container shall be used when collecting water to be filtered off-site. For example, collect water destined for metals and anions analysis in a polyethylene bottle or carboy; transport organics in a glass container. Do not use the same container that is used to transport the unfiltered water from the field as the final container that is shipped to the analytical laboratory. All containers must meet the minimum cleanliness specifications described in ER-SOP-01.02.

8.7.13 Lable sample containers. Preserve and store in accordance with ER-SOP-01.02 and fill out the sample collection log and chain of custody.

8.7.14 Decontaminate all sampling equipment upon completion of sampling activities at each port according to ER-SOP-01.08. Rinse the sampler around the face seal and the bottom connector. With the sampler valve open, flush the interior or the sampler from the bottom connector. In similar fashion, decontaminate the interconnected hoses.

8.7.15 Handle all wastewater generated from decontamination in accordance with ER-SOP-01.06.

8.7.16 Secure the well casing and well vault. Restore the site to its pre-sampling condition. Secure the site on departure.

8.8 Lessons Learned

During the performance of work, **field team members** shall identify, document, and submit lessons learned, as appropriate. in accordance with QP-3.2, Lessons Learned, located at http://erinternal.lanl.gov/home_links/Library_proc.htmQuality/user/qps.asp.

9.0 REFERENCES

ER personnel using this procedure should become familiar, as applicable or appropriate, with the contents of the following documents located at http://erinternal.lanl.gov/home_links/Library_proc.shtml to properly implement this SOP.

- ER-SOP-01.02, Sample Container and Preservation
- ER-SOP-01.03, Handling, Packaging, and Shipping of Samples
- ER-SOP-01.04, Sample Control and Field Documentation
- ER-SOP-01.06, Management of Environmental Restoration Project Wastes
- ER-SOP-01.08, Field Decontamination of Drilling and Sampling Equipment
- ER-SOP-06.02, Field Analytical Measurements of Groundwater
- ER-SOP-06.03, Sampling for Volatile or Organic Compounds in Groundwater
- QP-2.2, Personnel orientation and Training
- QP-3.2, Lessons Learned
- QP-4.2, Standard Operating Procedure Development
- QP-4.4, Record Transmittal to the Records Processing Facility
- QP-5.2, Control of Measuring and Test Equipment
- QP-5.7, Notebook Documentation for Environmental Restoration Technical Activities
- Operations Manual, MOSDAX Sampler Probe – Model 2532
- Operations Manual, MOSDAX Handheld Controller – Model 2525
- Operations Manual, Nonvented Sample Bottle – Model 2420

10.0 RECORDS

10.1 Chain-of-Custody/Request for Analysis Form

10.2 Daily Activity Log or Completed Field Notebook (copies submitted quarterly)

10.3 Sample Collection Log

10.4 Water Quality Sampling Record for Westbay Wells (Attachment C)

10.5 Westbay Groundwater Sampling Field Data Sheet (Attachment B)

11.0 ATTACHMENTS

Attachment A: Equipment and Supplies Checklist for Sampling the Westbay MP System® (1 page) located at

http://erinternal.lanl.gov/Quality/user/forms. aspAttachment B: Westbay Groundwater Sampling Field Data Sheet and Instructions (3 pages) located at http://erinternal.lanl.gov/Quality/user/forms.asp

Attachment C: Water Quality Sampling Record for Westbay Wells and instructions (6 pages) located at http://erinternal.lanl.gov/Quality/user/forms.asp

Using a token card, click here to record "self-study" training to this procedure.

If you do not possess a token card or encounter problems, contact the RRES-ECR training specialist.

Equipment and Supplies Checklist for Sampling the Westbay MP System®

- ☐ Tubing for Vacuum Pump
- ☐ Monitoring Equipment (turbidity, pH or P (if called for), alkalinity kit, conductivity, dissolved oxygen, and temperature)
- ☐ MOSDAX Sampler Probe – Model 2532
- ☐ MOSDAX Handheld Controller – Model 2525
- ☐ 4 Non-vented Sample Bottles – Model 2420
- ☐ Sample containers and preservatives
- ☐ Coolers and Blue Ice (or equivalent)
- ☐ Plastic sheeting
- ☐ Filters (if required)
- ☐ Daily Activity Log forms
- ☐ Chain-of-Custody/Request-for-Analysis Forms
- ☐ Sample Collection Log forms
- ☐ Variance Log
- ☐ Custody Seals
- ☐ Sample Labels
- ☐ Any PPE listed or required in the SSHASP
- ☐ Vacuum Pump w/ backup hand pump
- ☐ Cables for hook-up to 12V battery
- ☐ Well Specific Attachments to SOP
- ☐ Sampling Trailer w/ winch and generator
- ☐ Graduated beaker for field parameter collection
- ☐ Field logbook to record all field activities
- ☐ Ice chests and ice for sample storage
- ☐ Alconox® and De-ionized water for decontamination

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ER, Groundwater Sampling Field Data Sheet

Project: _____ Date: _____
Monitoring Well No: _____ Start Time: _____
Sampling Zone No(s): _____ Technicians: _____

Zone No.	Run No.	Surface Function Tests						Position Sampler	Sample Collection checks (Probe located at sampling zone in MP casing.)								Comments (volume retrieved)
		Shoe Out	Close Valve	Check Vacuum	Open Valve	Evacuate Container	Close Valve	Locate Port ( ) Arm Out ( ) Land probe ( )	Pressure in MP ( )	Shoe Out	Zone Pressure ( )	Open Valve	Zone Pressure ( )	Close Valve	Shoe In	Pressure in MP	

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Additional Comments: (pH, Turbidity, S.C, etc.)

Instructions for Completing Westbay Groundwater Sampling Field Data Sheet

Use an indelible dark-ink pen. Make an entry in each blank. For entry blanks for which no data are obtained (except in Comments section), enter “UNK” for unknown, “N/A” for not applicable or “ND” for not done, as appropriate. To change an entry, draw a single line through it, add the correct information above it and date, initializing the change.

Header Information:

1. Project – Record the project title.
2. Monitoring Well No. –Record the number of the well being sampled.
3. Sample Zone No. – Record the number and depth of the zone being sampled.
4. Date —The date the zone was sampled.
5. Start Time – The start time the zone was sampled, in military format.
6. End Time – The time the sampling was completed, in military format.
7. Technicians – Record the initials of the persons performing the sampling.

Surface Function Checks:

1. Zone No. – Record the number of the zone being sampled.
2. Run No. – Record the number of the run.
3. Shoe Out – Place a check in this box after the shoe on the sampler has been activated in the vacuum coupling.
4. Close Valve – Place a check in this box after the valve on the sampler has been closed.
5. Check Vacuum – Record the final pressure after a vacuum has been maintained.
6. Open Valve – Place a check in this box after the valve has been opened.
7. Evacuate Container – Record the final pressure after the Westbay sample containers have been evacuated.
8. Close Valve – Place a check in this box after the valve has been closed.

Position Sampler:

1. Locate port, arm out, and land probe – Place a check after each function has been performed.

Sample Collection Checks:

1. Pressure in MP – Record the pressure reading inside the MP casing after the probe has landed on the coupling.
2. Shoe Out – Place a check in this box after the shoe has been activated.
3. Zone Pressure – Record the pressure of the formation.
4. Open Valve – Place a check in this box after the valve has been opened.
5. Zone Pressure – Record the pressure when the pressure in the Westbay sample bottles equals the zone pressure from the first reading of the zone pressure (number 3).
6. Close Valve – Place a check in this box after the valve has been closed.
7. Shoe In – Place a check in this box after the shoe has been retracted.
8. Pressure in MP – Record the pressure in the MP casing. A reading the same as in number 1 indicates the sample is ok.
9. Comments – Record any additional information and any problems associated with the run.

Water Quality Sampling Record for Westbay Wells

Date: _____

Technical Area: _____ Focus Area: _____ Sample Identification: _____

Site Work Plan: _____ Well Number: _____

Zone Number: _____ Depth: _____

Field Team Member Signature: _____

(Print name and title, then sign.)

WATER SAMPLED:

Sample Type: _____

Zone Number: _____

Depth: _____

Sampling Period: Start _____ Complete _____

SAMPLING INFORMATION	PARAMETER MEASUREMENTS WHILE SAMPLING
Filter Size: _____	Negative Log Base 10 of Hydrogen-Ion Activity (pH): _____ S.U.
Thermometer ID: _____	Specific Conductance EC: _____ µS/cm
EC Meter ID: _____	Temperature (Temp): _____ °C
pH Meter ID: _____	Dissolved Oxygen (DO): _____ mg/L
Alkalinity Kit ID: _____	Turbidity (Turb): _____ NTU
Turbity Kit ID: _____	Alkalinity (Alk): _____ mg/L, $CaCO_3$
Preservation Methods and Comments: _____	Pressure: _____ (psi)

SAMPLE TYPES

D – Duplicate	T – Trip
F – Field	R – Replicate
K – Known	A – Acid Blank

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Water Quality Sampling Record for Westbay Wells (Cont.)

Date: _____ Page 2 of 3

Technical Area: _____ Focus Area: _____ Well Number: _____

CALIBRATION INFORMATION

Date/Time of EC Calibration: _____

Standard Solution: _____µS/cm, Instrument Reading _____ Lot No. _____ Exp. Date: _____
Standard Solution: _____ µS/cm, Instrument Reading _____ Lot No. _____ Exp. Date: _____

Date/Time of pH Calibration: _____

Standard Solution _____ pH, Instrument Reading _____ pH solution Lot No. _____ Date: _____
Standard Solution _____ pH, Instrument Reading _____ pH solution Lot No. _____ Date: _____

Slope _____

Date/Time of Turbidity Calibration: _____

Date/Time of Dissolved Oxygen Meter Calibration: _____

SHIPPING INFORMATION

Lab(s) Shipped To: _____ _____ _____

Date(s) Shipped: _____ _____ _____
_____ _____ _____

Method of Shipment: _____

Comments:

_____
_____
_____
_____
_____
_____

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Water Quality Sampling Record for Westbay Wells (Cont.)

Date: _____ Page 3 of 3

Technical Area: _____ Focus Area: _____ Well Number: _____

Zone Number: _____

Depth: _____

Signature: _____

(Print name and title, then sign.)

Time	Run No.	Volume retrieved (liters)	Parameter Measurements							Comments
			pH	EC (mS/cm)	Temp (^{o}C)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	Pressure of zone (psi)	Alkalinity(mg/L $CaCO_3$)	

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Instructions for Completing Water Quality Sampling Record for Westbay Wells

Use an indelible dark-ink pen. Make an entry in each blank. For entry blanks for which no data are obtained (except in Comments section), enter "UNK" for unknown, "N/A" for not applicable or "ND" for not done, as appropriate. To change an entry, draw a single line through it, add the correct information above it and date, initializing the change. For all forms, complete the following information:

Header Information:

1. Date—The date the zone was sampled.
2. Technical Area (TA)—Two-digit number which indicates the TA in which the activity is being performed.
3. Focus Area—Focus Area in which the activity is being performed.
4. Monitoring Well Identification—Alphanumeric designation indicating the specific monitoring well location.
5. Sample Identification—Follow SOP-01.04, Sample Control and Field Documentation for sample identification.
6. Site Work Plan—Title of plan.
7. Field Team Member Identification—Print your name and position title, then sign.

Groundwater Sampled:

1. Indicate the well number, zone, and depth of zone of the well being sampled.
2. Sample Types—One-character codes that distinguish the type of sample collected. This classification permits the analysis of data for specific groups of samples. The codes are identified at the top of the form's first page.
3. Sample Period—The starting and ending times of sample collection, in military time format.

Sampling Information:

1. Filter size—Size of filter used.
2. Thermometer ID—The identification of the thermometer used.
3. Conductivity Meter ID—The control number or serial number and manufacturer of the meter used to measure the specific conductance of samples or calibration solutions.
4. pH Meter ID—The control number or serial number and manufacturer of the meter used to measure the pH of the samples.

5. Oxidation-Reduction Potential (ORP) Meter ID ---The control number and manufacturer of the meter used to measure the P of the samples or calibration solutions.
6. Alkalinity Kit ID—Identification and model or serial number of the alkalinity kit used.
7. Turbidity Meter ID— The control number or serial number and manufacturer of the meter used to measure the turbidity of samples or calibration solutions.
8. Preservation Methods and Comments—Include preservation method, acidified or non-acidified, type of acid (if acid was used to preserve water sample), and any additional information regarding preservation.

Parameter Measurements (Recorded at the time of sample collection.):

1. Negative Log Base 10 of Hydrogen-Ion Activity—The pH value in standard units (S.U.).
2. Oxidation-reduction potential in ± milli Volts (mV).
3. Specific Conductance (EC)—The specific conductance of the water sample in micro-seimen per centimeter (µS/cm).
4. Temperature—The temperature of the water sample in degrees Celsius (°C).
5. Dissolved Oxygen—The dissolved oxygen content of the water sample in milligrams per liter (mg/L).
6. Turbidity—The turbidity of the water sample in nephelometric turbidity units (NTU).
7. Pressure-The pressure of the zone in pressure per square inch (psi).

Calibration Information:

1. Date/Time of EC Calibration—Date and time that the specific conductivity meter was last calibrated.
2. Standard Solution EC Readings—Record the standard specific conductance of the solution(s) used and the reading(s) when the probe was immersed. Include lot number(s) and expiration date(s) of the standard solution(s).
3. Date/Time of pH Calibration—Date and time that the pH meter was last calibrated.
4. Standard Solution pH Readings—Record the standard pH values of the two solutions used and the readings when the probe was immersed. Include lot numbers and expiration dates of the standard solutions. Also, if the meter indicates a slope after the calibrations record the number. Record the readings of pH solutions used in the calibration after each period of use (daily) to check for drift.

5. Date/Time of ORP operational check. Date and time the P probe and meter were last checked. Record the P value (+ mV) after probe is immersed in appropriate solution to check for operation of probe and meter. Include lot numbers and expiration dates of the standard solutions.
6. Date/Time of Turbidity Calibration—Date and time that the turbidity meter was last calibrated.
7. Date/Time of Dissolved Oxygen Calibration—Date and time that the D.O. meter was last calibrated.

Shipping Information:

1. Include the shipping date, method, and the laboratory where the samples were sent.
2. Comments—This is a space for additional information about any entry on the form.

Parameter Measurements:

1. Negative Log Base 10 of Hydrogen-Ion Activity—The pH units of the sample.
2. Specific Conductance—The specific conductance of the water in micro Seimens per centimeter (µS/cm).
3. Temperature—The temperature of the groundwater in degrees Celsius (°C).
4. Dissolved Oxygen—The dissolved oxygen content of the water in milligrams per liter (mg/L).
5. Turbidity—The turbidity of the groundwater in nephelometric turbidity units (NTU).
6. Pressure—The pressure of the zone in pounds per square inch (psi).
7. Alkalinity—The alkalinity of groundwater in mg/L, $CaCO_3$.
8. ORP—Write the oxygen reduction potential of the sample (performed only when ordered by the site geochemist) under comments.

Comments: Note any other pertinent information.

Operations Manuals

MOSDAX Handheld Controller – Model 2525

Non-Vented Sample Bottle – Model 2420

MOSDAX Sample Probe – Model 2532